

Appendix I – TIASTAR Motor Control Center General Specifications

General

1.0 The Motor Control Center(s) (MCC) shall be TIASTAR as manufactured by Siemens Energy & Automation and shall consist of structure(s), bus power distribution system and various motor control and distribution units. MCC(s) shall be built, designed and tested to the latest applicable standards of NEMA Publication ICS 2-322, UL 845 and the NEC.

Structure

- 2.0 The enclosure shall be NEMA Type (1), (1-with gasketed doors), (2), (12), (3R non-walk-in). Vertical sections shall be constructed with steel divider sheet assemblies formed or otherwise fabricated to eliminate open framework between adjacent sections or full-length bolted-on side sheet assemblies at the ends of the MCC(s).
- 2.1.0 Vertical sections shall be 90" high excluding mounting sills, 20" wide and (15") (20") deep for front mounting of units. Where indicated that arrangement is to accommodate front & rear mounting of units, the structure depth shall not exceed 21". The width of the vertical section may be increased for special oversize units that cannot be accommodated in the standard 20" wide structure.
- 2.1.1 Vertical structures shall be divided into six (6) 12" space factors and shall accommodate six (6) full size NEMA size 1 or 2 Full Voltage Non-Reversing FVNR combination starters. MCC unit sizes shall be multiples of 1/2 space factor (6"). The vertical structures shall accommodate 6" high density and dual mounted units.
- 2.1.2 Back-to-back (front & rear unit mounting) structures shall be 21" deep maximum and shall accommodate 12 full size NEMA size 1 or 2 Full Voltage Non-Reversing FVNR combination starters per section.
- 2.1.3 Each standard 20" and 24" wide structure shall be supplied with a vertical wireway (4" wide on 20" wide structures and 8" wide on 24" wide structures) that is completely isolated from all power busses. The rear surface of the vertical wireway shall be painted white. A minimum of three (3) formed wire cable supports, extending the full depth of the vertical wireway shall be supplied in each vertical section. A separate hinged door shall cover the vertical wireway.
- 2.1.4 Each standard structure shall be supplied with 12 inch top and six (6) inch bottom horizontal wireways that are continuous for the entire length of the MCC.
- The minimum horizontal wireway opening between sections is 40 square inches for the top and 30 square inches for the bottom horizontal wireway. A hinged door shall be supplied to cover the top horizontal wireway.
- 2.1.5 Doors are to be hinged in a manner that allows for the removal of individual doors without the removal of any door above or below. Unit doors shall be hinged on the left and vertical wireway doors on the right for unobstructed access to the units and associated vertical wireway. All doors shall be mounted on removable pin-type hinges and secured with steel quarter-turn, indicating type fasteners.
- 2.1.6 Wireways shall be completely isolated from bus compartments by suitable barriers. Sliding barriers between the horizontal bus and top horizontal wireway are not acceptable.
- 2.1.7 Removable top cover plates shall be provided for conduit entry to the top horizontal wireway and shall provide a minimum of 116 square inches of area for conduit location. Top cover plates shall be fabricated from 13 gauge steel.
- 2.2 All MCC structures shall be supplied with 1 1/8" high X 3" wide base channel sills that are continuous for the entire length of the shipping split. The base channel sills shall be fabricated of 7 gauge steel and shall be suitable for grouting the base channel sills in place, welding to leveling plates or securing to the floor with 1/2" anchor bolts. MCC structures shall be supplied with reversible bottom end cover plates to cover the bottom horizontal wireway and ends of the base channel sills. The bottom end cover plates shall be factory installed to cover the ends of the base channel sills to prevent entrance of dirt and rodents into the MCC when installed flush on the floor and shall be reinstallable to expose the ends of the base channel sills if they are to be grouted into the floor.
- 2.3 A removable, full length lifting angle shall be provided for each shipping split of the MCC(s). The lifting angle shall be bolted to each side sheet or divider sheet of the shipping split to evenly distribute the weight of the MCC during lifting.

- 2.4 MCC's shall be assembled in such a manner that it is not necessary to have rear accessibility to remove any internal devices or components.

Bus

- 3.0 The main horizontal bus shall be rated at (600) (800) (1200) (1600) (2000) amperes. Horizontal bus bars shall be mounted edge wise and located at the top of the MCC.
- 3.0.1 All power bus shall be braced to withstand a fault current of (42,000) (65,000) (100,000) RMS symmetrical amperes.
- 3.1 Horizontal bus shall be tin (silver) plated copper with a conductivity rating of 100% AICS. The horizontal bus bars shall be fully sized to carry 100% of the rated current the entire length of the MCC. Tapered horizontal bus is not acceptable.
- 3.1.1 Regardless of amperage rating, the entire horizontal bus assembly must be located behind the top horizontal wireway. Horizontal bus bars located behind usable unit space are not acceptable.
- 3.1.2 The horizontal bus shall be isolated from the top horizontal wireway by a clear, flexible, polycarbonate (Lexan[®]) barrier allowing visual inspection of the horizontal bus without removing any hardware.
- 3.2 The vertical bus shall be rated 300 (600) amperes. Vertical bus bars shall be fabricated of tin (silver) plated solid copper bars with a conductivity rating of 100% AICS.
- 3.2.1 The vertical bus assembly shall be isolated from the unit mounting space by means of a full height steel barrier. Provisions shall be made to close off unused unit stab openings in the vertical bus barrier with removable covers.
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- The vertical bus barrier support shall be designed as to effectively enclose each vertical bus bar. Provisions shall be made to close off unused unit stab openings in the vertical bus barrier with removable covers.
- 3.3 All bus ratings are to be based on a maximum temperature rise of 50°C over a 40°C ambient temperature.
- 3.4 Horizontal to vertical bus and horizontal bus splice connections shall be made with two (2) ³/₈" grade 5 bolts and Belleville-type conical washers at each connection point. All connecting hardware shall be designed to be

tightened from the front of the MCC without applying any tools to the rear of the connection.

Units

- 4.0 Plug-in units shall connect to the vertical bus by means of self-aligning, tin plated copper stab-on connectors provided with spring steel back-up springs to insure positive connection to the vertical bus.
- 4.0.1 When vertical ground bus is specified, plug-in units shall include a ground stab which engages the vertical ground bus before the power stabs engage the vertical bus when the unit is inserted into the structure. When the plug-in unit is withdrawn from the vertical bus, the vertical ground stab shall release after the power stabs.
- 4.1 The interior of all MCC units shall be painted white, including unit top and bottom plates or isolation barriers.
- 4.1.1 All plug-in units 12" tall and larger will include two (2) auxiliary handles to aid in installation, removal and transporting plug-in units.
- 4.1.2 All plug-in units will include a racking mechanism to assure full engagement of the stab-on connectors with the vertical bus.
- 4.1.3 Plug-in units shall be provided with interference type draw-out to prevent complete removal of the plug-in unit from the structure in one motion. The interference mechanism shall also provide clear indication when the plug-in unit has been withdrawn to the "TEST" position.
- 4.1.4 A mechanical interlock shall be supplied on all plug-in units to prevent insertion of removal of a unit from the structure when the unit operator handle is in the ON position. This interlock may not be defeated.
- 4.1.5 Each 12" tall and larger plug-in unit shall be secured in the structure by two (2) readily accessible devices, one of which is tool operated. These devices shall be located at the front of the unit.
- 4.1.6 Plug-in units with NEMA Type B or C wiring shall be supplied with unit terminal block mounted on the right hand side of the unit, adjacent to the vertical wireway. The terminal blocks shall be mounted on a movable bracket that maintains the terminals inside the unit structure for normal operation and pivots into the vertical wireway exposing the terminals for wiring, test and maintenance.
- 4.1.7 All plug-in units shall include a positive means of grounding the unit to the structure at all times.

- 4.1.8 The MCC unit disconnect operator for 600 ampere maximum units shall operate in a vertical (up-down) plane (except high density units which have horizontal motion) and shall remain engaged with the disconnect device at all times, regardless of the unit door position. The operating handles shall be interlocked with the unit door so that the door cannot be opened with the disconnect device in the ON position, nor can the disconnect device be turned ON with the unit door open except by operation of a defeater mechanism. Indication of the disconnect device shall be clearly indicated by the position of the operating handle. When applied with circuit breaker devices, the handle shall also provide clear indication of a circuit breaker trip.
- 4.2 When pilot lights, push buttons or sector switches are specified. The devices shall be mounted in a formed metal device panel that is capable of accepting four (4) such devices in any combination. The device panel shall be secured to the unit door for normal operation, or mounted on the plug-in unit as required for unit removal and bench testing.
- 4.2.1 Pilot devices, when specified, shall be 22 mm in diameter, rated for NEMA 4 (IP67) applications. Connections to 22 mm pilot devices shall be made to touch resistant screw type terminations. Pilot device contacts shall be rated at 10A, 600 VAC (NEMA A600).
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- Pilot devices when specified, shall be heavy duty, oil tight 30mm devices with a NEMA 4 rating. Pilot device contacts shall be rated at 10A, 600 VAC (NEMA A600). The pilot device bodies shall be fabricated from metal.
- 4.3 Unit identification nameplate shall be provided for each unit. Nameplates shall be a black surface with white core. Engraving shall cut through the black surface exposing white lettering of the unit designation. Nameplates shall be 1" tall by 3 1/2" wide. Adhesives or glues are not an acceptable means of mounting unit nameplates.